

# BEST MANAGEMENT PRACTICES FOR GEORGIA URBAN GARDENERS TO REDUCE NONPOINT SOURCE POLLUTION

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**REFERENCE:** *Proceedings of the 2001 Georgia Water Resources Conference*, held March 26-27, 2001, at the University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, the University of Georgia, Athens, Georgia.

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**Abstract.** Water quality samples collected by the U.S. Geological Survey from March 1993 through April 1994 from one urban and two agricultural watersheds in the Apalachicola-Chattahoochee-Flint and Ocumulgee River basins were analyzed for 84 commonly-used pesticides (Frick et al., 1998). More pesticides were detected and at generally higher concentrations in water from urban watersheds than from agricultural watersheds. In 1989, the National Academy of Sciences stated homeowners tend to use as much as ten times more chemicals per acre on their lawns than farmers use on agricultural lands (Jenkins, 1994). Nonpoint source pollution from pesticide and nutrient loading in urban areas increases with increasing development and the affluence of many new population centers. Metro Atlanta has grown by 26% since 1990 (U. S. Census Bureau, 2001). A five-year, three-phase project is underway to develop and disseminate Best Management Practices for Georgia home gardeners to encourage changes in behavior that will reduce nonpoint source pollution of urban surface waters due to pesticides and fertilizers.

## INTRODUCTION

Farmers are financially motivated to use no more fertilizer and pesticide than required for profitable crop production. Landscape professionals who treat urban landscapes are trained in fertilizer and pesticide application. But, homeowners have little financial or regulatory incentive to correctly apply fertilizers and pesticides. Therefore, the cumulative misuse of gardening chemicals by urban homeowners has an ever-increasing potential to seriously degrade urban surface waters. According to a 1999 gardening survey, 76 percent of Georgia homeowners do their own lawn maintenance and pest control. In their recent report, *Water Quality in Georgia 1996-1997*, the Georgia Environmental

Protection Division discusses the current challenge to improving surface water quality by reducing nonpoint source pollution from washing into rivers and lakes by stormwater. Their list of pollutants includes fertilizers and pesticides. GAEPD emphasizes that, "Citizens must individually and collectively be part of the solution to these challenges".

## BACKGROUND

Outlined below is the scope of the project.

### Phase One

This phase consisted of collecting program materials produced by other states designed to reduce fertilizer and pesticide use. This information was compiled and published in the *National IPM Catalogue of Publications and Professionals* to use as a database from which educational materials for Georgia homeowners would be developed. Integrated Pest Management (IPM) combines various cultural, biological, chemical control and habitat modification techniques to minimize damage to human health and environment by promoting plant health care. *Landscape Management Manual for Georgia Homeowners* was produced from a similar manual targeted for industry professionals. A statewide survey was conducted of Georgia homeowners to learn their attitudes about gardening, their use of fertilizers and pesticides, and where they receive their gardening information.

### Phase Two

Currently underway, a draft of the BMP Manual has been written and is under review. Three homeowner brochures will be developed from this information. Simultaneously, an Advanced Master Gardener Program has been formed to train members in the use of the Manual

for homeowner workshops and telephone inquiries. Both program materials and methods will be tested in a pilot program in the Big Creek Watershed in Alpharetta, Ga.

### **Phase Three**

This phase consists of disseminating BMP's for Georgia homeowners throughout urban areas, particularly Metro Atlanta. It is neither funded nor fully developed but studies are being conducted to determine what methods and materials other states use to provide gardening information to homeowners. Both materials and methods are being reviewed for their effectiveness at behavioral change. Additional educational materials may be produced such as videos and slide presentations to be used for training.

## **SURVEY**

### **Survey Questions and Methods**

A statewide survey of adult Georgians was conducted by the Survey Research Center during the spring of 1999. The purpose of the study was to determine homeowner's use of fertilizer and pesticides, their knowledge and interest in pollution prevention gardening practices, where they currently receive information, and where they would prefer to receive it.

A team consisting of agricultural economists, entomologists, horticulturists and environmental specialists drafted the survey questionnaire. The study required a total of 400 completed telephone interviews from a random digit dialed sample of Georgia homeowners 18 years and older. The procedures insured that all adult Georgians had an equal chance of being selected in the sample. Sampling error was no greater than +/- 4.9 percent, with a 95 percent level of confidence.

### **Survey Highlights**

The typical Georgia home gardener is female (61%) with an average age of 47 years and has greater than a high school education (70%). They earn a gross annual income greater than \$50,000 (59%) and live in a small city or suburb (55%). Their principle source of gardening information is their friends and neighbors, but they would prefer to have it available at the point of purchase.

Of particular interest was whether homeowners employed pollution prevention practices in gardening and whether they were aware of alternatives to pesticides. The profile of respondents who answered yes or no to each question can be found in Table 1 and 2.

Seventy-three percent of Georgia homeowners indicated they check for insect pests. Scouting for pests is an important strategy of Integrated Pest Management. It allows the applicator to diagnose a pest infestation and apply pesticides only when and where needed. This is especially important in Georgia and the Southeast where the long growing season promote great numbers and diversity of insects of which only 3% are classified as pests (Sparks, 1996). In the absence of scouting, pesticides may be sprayed on an entire landscape as a preventative measure for pest infestation. When the whole landscape is treated, more pesticides are applied than are perhaps needed which may runoff into surface water. In addition, the population of beneficial insects, such as predators or parasites of pests and those that pollinate flowers, may be significantly reduced.

According to the survey, 37 percent of respondents reported they used pest and disease-resistant plants. This number was surprisingly high because the use of pest and disease resistant plants requires knowledge of pest and disease plant tolerance and involves a search for suppliers that stock these plants. Typically, plants are not labeled with this information.

Forty-five percent of Georgia homeowners surveyed indicated they compost their yard waste. Composted yard waste and food scraps provide much needed nutrients to Georgia soil. It can also be used as a mulch on plants to retain soil moisture. Little or no fertilizers are required in landscape management if a homeowner composts organic waste.

Sixty-seven percent of survey respondents recognized that there are alternatives to chemical pesticides. Due to concerns for the environment, pesticide control is shifting to alternative controls such as insecticidal soaps, horticultural oils, and even live lady bugs which have become available at retail outlets. In fact, pesticide use in home gardening has decreased 12 percent since 1979 (Aspelim and Grube, 1999).

An even greater majority of homeowners reported an interest in learning about alternatives to pesticides. This data indicates gardeners will be receptive to a marketing campaign emphasizing pesticide alternatives.

The survey also indicated 72 percent of Georgia home gardeners expressed an interest in learning more about pest resistant plants. This will involve making this information available at the point of purchase.

**Table 1. Respondents Practicing Pollution Prevention in Home Landscapes**

Georgia homeowner profile	Do you check your outdoor plants for insect pests?	Do you use pest- or disease resistant plants?	Do you compost yard waste for use in your yard?
Average Age, in years	48	48	48
	----- percent -----		
<b>Gender</b>			
Male	40	41	45
Female	60	59	55
<b>Education</b>			
High school or less	28	27 <sup>a</sup>	29
Some college, college degree	58	53 <sup>a</sup>	59
Post graduate	13	18 <sup>a</sup>	12
<b>Annual Income</b>			
<\$50,000	41	43	41
\$50,000 - \$75,000	32	31	32
>\$75,000	27	27	27
<b>Location</b>			
Small city/suburb	57	60	52
Rural	16	14	18
Large city	14	12	17
County outside town	9	12	9
Farm	3	3	3

<sup>a</sup> Differences across education levels confirmed by statistical test at  $\alpha = .10$ .

Source: Varlamoff et al., 2000.

**Table 2. Respondents Interest in Learning about Alternatives to Pesticides**

Georgia homeowner profile	Do you know there are alternatives to chemical pesticides?	Would you be interested in learning more about alternatives to chemical pesticides?	Would you be interested in knowing what pest-resistant plants are available?
Average Age, in years	50	45	46
	----- percent -----		
<b>Gender</b>			
Male	40	38	36
Female	60	62	64
<b>Education</b>			
High school or less	23 <sup>a</sup>	29	28
Some college or college degree	61	56	57
Post graduate	15	14	14
<b>Annual income</b>			
<\$50,000	41 <sup>a</sup>	41 <sup>b</sup>	41
\$50,000 - \$75,000	33 <sup>a</sup>	32 <sup>b</sup>	32
>\$75,000	26 <sup>a</sup>	27 <sup>b</sup>	27
<b>Location</b>			
Large city	13	14	14
Small city/suburb	56	58	58
Rural area	17	15	15
County outside town	11	10	10
Farm	3	3	2

<sup>a</sup> Differences across income groups were confirmed statistically at  $\alpha = .01$ .

<sup>b</sup> Differences across income groups were confirmed statistically at  $\alpha = .10$ .

Source: Varlamoff et al., 2000.

## DEVELOPMENT OF BMP'S

Best Management Practices for Georgia home gardeners are based on elements completed in phase one of this project. Educational materials collected for the national IPM catalogue relating to the reduction of fertilizer and pesticide use were reviewed for their usefulness in Georgia. Several states have well developed programs to reduce nonpoint source pollution of surface and ground waters, most notably: Virginia and Maryland for the Chesapeake Bay, Florida for their extensive canals and groundwater, and Minnesota for Twin City lakes. Survey results were analyzed to learn how Georgia gardeners apply fertilizers and pesticides and if they know and are receptive to learning about pesticide alternatives and purchased fertilizers. Survey results determined information gaps and areas where emphasis was needed. Finally, with the latest research material compiled in the *Landscape Management for Georgia Homeowners* plus information gleaned from other states targeting nonpoint source pollution, a BMP Manual was created to train Georgia homeowners. A series of homeowner brochures will be written from the Manual on various topics.

## DISSEMINATION

Initially, the training Manual will be used by the Advanced Georgia Master Gardener Program for homeowner workshops throughout the state particularly the Metro Atlanta Area. This Manual will also be available in all County Extension Offices to answer telephone inquiries from the public. It will also be available on the Research & Education web site.

### Pilot Project

The methods and materials will be tested in the Big Creek Watershed that flows into the Upper Chattahoochee River, a Category 1 watershed in Alpharetta. This project will be organized through the Alpharetta Environmental Services Environmental Center with emphasis placed on reducing pesticides found in the Big Creek Watershed. Two months following the homeowner workshop, participants will be re-contacted to learn which BMP strategies they employed.

## CONCLUSIONS

The challenge remains to make Georgia urban gardeners aware there is a problem of surface water quality, that their actions may contribute to their degradation and they have a means to change gardening

practices to improve surface water quality. This movement to re-educate the public in response to an environmental issue has been compared to the successful recycling movement of the 1980's. Most people want to do the right thing when given a precise way to contribute to the solution of the problem. This project to reduce nonpoint source pollution of urban surface waters resulting from fertilizer and pesticide runoff involves effectively disseminating educational materials to receptive Georgia gardeners. In five years, Georgia homeowners will be resurveyed to determine if they are employing BMP's.

## ACKNOWLEDGMENTS

Phase one and two of this project were funded by the Federal EPA, Pollution Prevention Assistance Division of the Georgia Department of Natural Resources, and the University of Georgia College of Agricultural and Environmental Sciences.

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